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MILK CONDENSING

By R. R. Rogers

Detroit, Mich.

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Illustrative and Descriptive

CATALOG
on Milk Condensing

By
R. R. ROGERS
~~Detroit, Mich~~.
Winthrop, Maine.

INTRODUCTORY

IT affords me great pleasure in issuing this illustrated and descriptive catalogue on Condensed Milk and machinery for its manufacture, as it is the first illustrated catalogue that has ever been issued on the subject.

My object in issuing same is to give general information as to the manufacture of condensed milk, the machinery necessary for same, the processes used, the various kinds made, and in fact cover the subject in such a manner that anyone contemplating the erection of a milk condensing plant will understand the matter as fully as possible without a personal meeting.

To those that are unfamiliar with the manufacture of condensed milk I will say that cow's milk contains about 87 per cent of water, and the removal of a large part of the water and retaining the milk solids is called condensing it. When the fresh milk is received at the condensing factory it is inspected as to its condition, purity and richness (for nearly all condensing factories purchase their milk by the Babcock test). The milk which passes inspection is put into the weigh can and weighed, and is then run into a storage tank commonly called receiving tank, which is built of either copper or tin, where it is held until used.

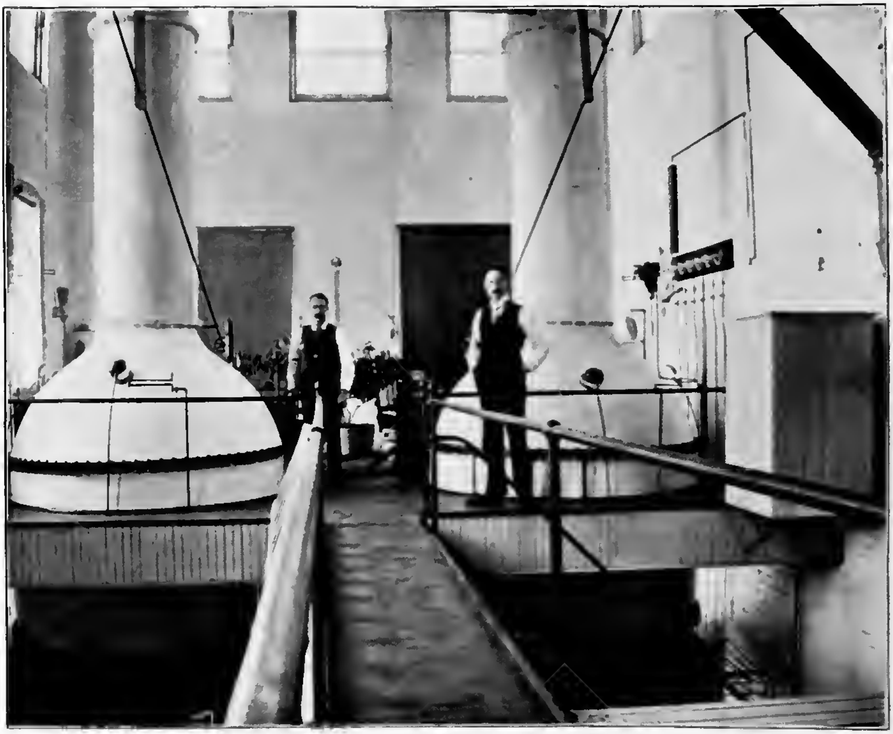
Nearly all condensing factories wash and steam the inside of the carrying cans to insure their cleanliness, but the patron must keep the outside of the can clean.

Condensing factories are kept scrupulously clean, and the milk used is the best that can be secured, and notwithstanding the fact that these factories pay a much higher price for fresh milk than it will bring for any other purpose, the business is very profitable, much more so than it is generally supposed.

The machinery is usually set so that the factory is run on a gravity system, so that the milk runs from the receiving tank to the defecators, or through the separators to the defecators, as the class of goods require, where the milk receives its first treatment for condensing. From the defecators it is drawn into the vacuum pan, from which the vacuum pump has removed a large percentage of the air so that the milk can be boiled or condensed at a very low temperature (120F-130F). When it has been condensed to the proper density the vacuum pump is stopped, the air is let into the vacuum pan, and the milk is drawn from the vacuum pan into the cooling cans, which are then placed into the cooling machine.

The stirrers and stirrer holders are then adjusted and the cooling machine started. When the milk has been properly stirred and cooled it is ready to be put in shipping packages, as the class of goods demand. This process is repeated as many times each day as necessary, most condensing machinery requiring from three to four such runs to be made each day to run it to its full capacity. When sugared condensed milk is made the sugar is added in the defecators.

There is a very great difference as to how the milk is treated before and after it is condensed. There are any number of ways in which the milk may be heated before it is taken into the vacuum pan, but to get the proper results there is but one way in which to heat it, and the same may be said in regard to cooling it after it leaves the vacuum pan. But no amount of manipulation on either side of the vacuum pan can produce good goods if the vacuum pan (which is the greatest point of all) is not properly handled. In fact there is but one way to handle the milk from the time it is taken in at the receiving room until it is shipped, if first-class goods are produced. This has been proven many times



A pair of seven foot Vacuum Pans operated as a Dry Vacuum System
Capacity 125,000 lbs. fresh milk daily

where factories have been built by inexperienced parties and proven failures, through their inability to produce first-class goods.

When contemplating building a milk condensing factory it is policy to ascertain the fresh milk and water supply, as it would not be policy to build unless a supply of from 3,000 to 5,000 pounds of fresh milk could be secured daily, with good prospects of increasing this amount as desired. The water supply is fully as important as the milk supply. There should be an abundance of water, which may be taken from wells, springs or streams, the colder the water the better, as the amount required depends upon the temperature.

Vacuum Pump used in Dry Vacuum Systems

Where possible the factory should be built near or upon a line of railroad, thereby avoiding the expense of cartage. There are cases where factories were built several miles from a line of railroad and have been very successful, but it is seldom that conditions exist that would warrant building any distance from the railroad.

There are many different kinds of condensed milk manufactured, but probably 90 per cent is made in three forms, viz:

Sugared condensed milk, which is put up in tin cans, barrels and half barrels; the plain unsugared condensed milk, which is handled in bulk in ten-gallon cans the same as fresh milk or cream; and the evaporated cream (which is simply fresh milk condensed and sterilized), which is also put up in tin cans. Ten, twelve, fourteen and sixteen-ounce cans are used for the sugared condensed milk, and the evaporated cream is put up in cans that hold from seven ounces up to and including five gallons.

The sugared condensed milk which is put up in tin cans and the evaporated cream are to be found in nearly every grocery and drug store in the world, and have become in many households as staple an article as flour or sugar; and as an infant's food it has no superior. Bear in mind that there is no record of injury to anyone from the use of pure condensed milk or evaporated cream. Many families prefer to use the condensed milk where the best and purest of fresh milk and cream is at hand, as a matter of taste, realizing that no dangerous or contagious disease germs lurk beneath its label.

Showing dome of two seven foot Vacuum Pans and operating platform

These goods will keep in any climate for years, and is really the family cow for the people living in all large eastern cities, in mining camps everywhere, and in all of our Southern states where grass and cows are scarce; while China, Japan, Australia and other countries consume large quantities of American condensed milk.

3076 cans—a days work at sealing

The barreled sugared condensed milk, like nearly all other kinds of condensed milk except evaporated cream, is made from milk that retains all its natural cream, milk from which one-half the cream has been removed, and milk from which all the cream has been removed. These goods have a certain amount of pure cane sugar added to insure their keeping qualities, and after being condensed are put in barrels holding from five to six hundred pounds each and shipped by freight to bakers and confectioners in all sections of the country.

The plain condensed milk is also made from full-cream, half-skimmed and full-skimmed fresh milk, which is condensed from three to four and one-half times. After it is condensed it is placed in ten-gallon shipping cans which are kept iced the same as cream, and is shipped by express or excess baggage. These goods, when kept at a fairly low temperature, will keep for weeks. It is used by ice-cream makers wherever it can be secured, as it makes a smoother, better bodied ice-cream, an ice-cream that will stand up better under the soda fountain. Ice-cream made from these goods does not distress you after eating like full-cream ice-cream does, reduces the cost of manufacture, and does away with the many dangers of being poisoned by eating ice-cream, and are superior in every way.

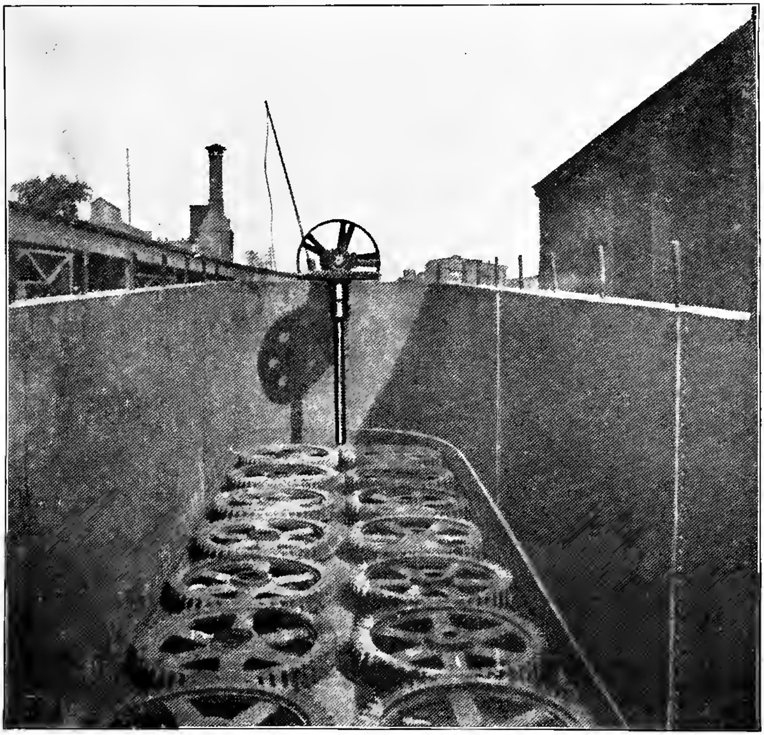
Improved Cooling Machine

The cost of manufacture of the different kinds of condensed milk depends largely upon the local conditions; but from the estimated cost given below anyone can easily ascertain the cost of manufacturing condensed milk at their point, as they can change the estimate to fit their local conditions.

Cost of manufacturing canned sugared condensed milk, basing 4 per cent milk at average price of $1.00 per 100 pounds, and amount at 50,000 pounds per day. One-pound tin cans, when made at the factory, at $10.00 per 1,000:

50,000 pounds of fresh milk at $1.00 per 100 pounds......$	500.00
8,500 pounds of pure cane sugar at average price of 5 cents per pound..................................	425.00
Seven tons of steam coal at $3.00 per ton................	21.00
20,400 one-pound condensed milk cans at $10.00 per 1,000	204.00
20,400 labels at 30 cents per 1,000.....................	6.12
Labeling 20,400 cans at 10c per 1,000 (machine labeler)..	2.04

Filling 20,400 cans at 10c per 1,000 (machine filler)......	2.04
Capping or sealing 20,400 cans by hand at 30c per 1,000..	6.12
One and one-half pounds of solder per 1,000 cans for sealing, at 16c per pound..........................	4.92
425 cases or boxes made up, at 10c each................	42.50
Superintendent and bookkeeper, $5.00; fireman and engineer, $2.00....................................	7.00
Vacuum pan operator, $4.00; milk inspector, $2.00......	6.00
Eight men at $1.50 each (balance of help work on piece work)	12.00
Oil, gasoline and miscellaneous expenses...............	6.51
Total daily expenses............................	$1,245.25



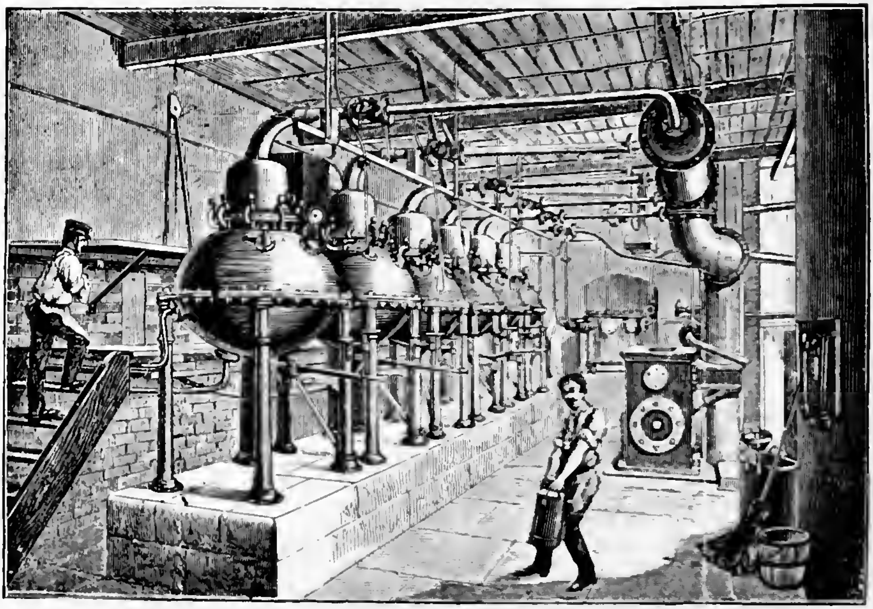
Interior view of Improved Cooling Machine.

Results: 425 cases (48 pounds to the case) of full-cream sugared condensed milk ready to ship, at a cost of $1,245.25, cost per case, $2.93. This is practice; theory says you can make a case of the above goods for $2.80. These goods sell from $3.75 to $5.00 per case.

With cost and conditions the same as in canned sugared condensed milk, evaporated cream would cost about one dollar less per case. Will be pleased to make special estimate of cost of manufacturing evaporated cream upon request.

Cost of manufacturing plain unsugared condensed milk, basing 4 per cent milk at $1.00 per 100 pounds, and amount at 1,200 gallons or 10,200 pounds:

10,200 pounds (1,200 gallons) of fresh milk at $1.00 per 100 pounds	$ 102.00
3,000 pounds of steam coal at $3.00 per ton	4.50
One superintendent and bookkeeper, $2.00; one milk inspector, $1.75	3.75
One copper cleaner, $1.50; vacuum pan operator, $3.00	4.50
One fireman and engineer, $1.50; two common hands at $1.25 each	4.00
Ice and miscellaneous expenses	3.25
Total daily expenses	$ 123.00

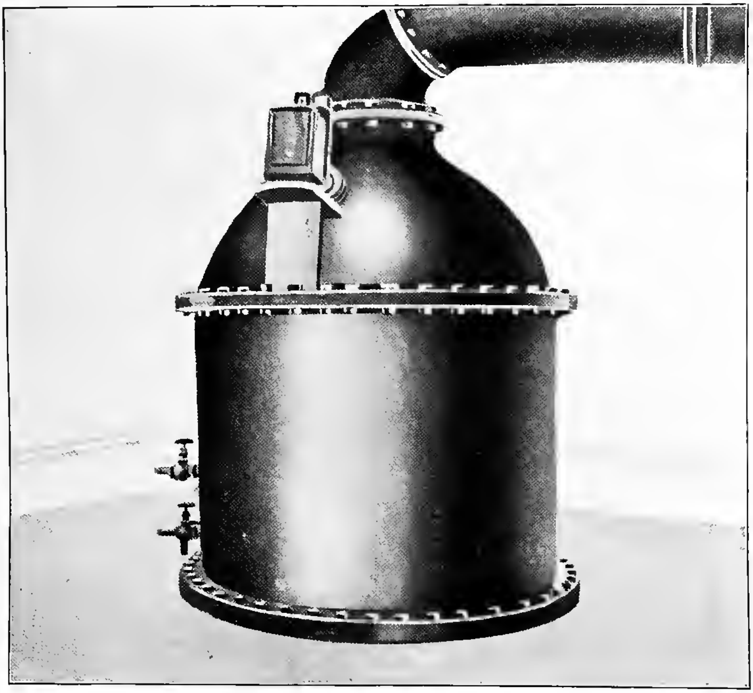


View of six direct connected Vacuum Pans. One of the first sets of condensing machinery constructed

If the goods were made from full-cream fresh milk you would have the following results: 370 gallons of full-cream plain condensed milk; cost per gallon, 34 cents; selling price per gallon, 50 cents; profit per gallon, 16 cents; daily profits, $62.00; six months or one hundred and eighty days' profit, $11,160.00.

If the goods were made from one-half skimmed fresh milk you would have the following results: 120 gallons of 20 per cent cream at 50 cents per gallon, $60.00; 309 gallons of one-half skimmed plain condensed milk at a cost per gallon of a fraction over 21 cents; selling price per gallon, 45 cents; profit per gallon, 24 cents; daily profits, $76.00; six months' or one hundred and eighty days' profit, $13,680.00.

If the goods were made from full-skimmed fresh milk you would have the following results: 240 gallons of 20 per cent cream at 50 cents per gallon, $120.00; 240 gallons of full-skimmed plain condensed milk at a cost of a fraction over one cent per gallon; selling price per gallon, 40 cents; profit per gallon, 39 cents; daily profit, $93.00; six months' or one hundred and eighty days' profit, $16,740.00.



Style of Vacuum Pan used ten years ago

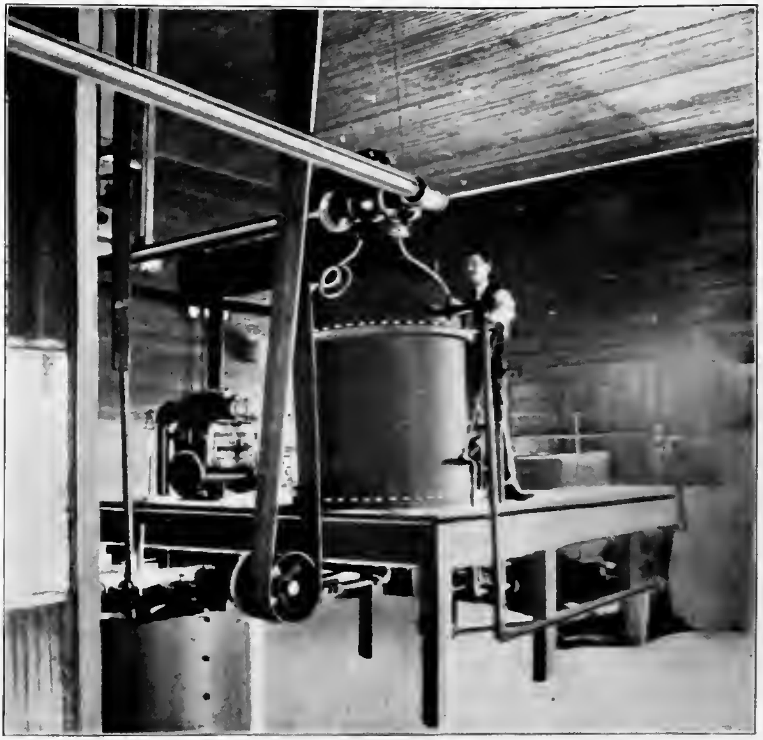
Cost of manufacturing barreled sugared condensed milk, using the same basis as to cost as the plain condensed milk ($123.00), with cost of sugar and barrels added to each item:

Daily expenses as above	$ 123.00
1,734 pounds of pure cane sugar at five cents per pound	86.70
Eight barrels at 75 cents each	6.00
Total daily expenses	$ 215.70

If the goods were made from full-cream fresh milk you would have the following results: 4,418 pounds of sugared condensed milk at 5¾ cents per pound, $254.03; daily profits, $38.33; six months' or one hundred and eighty days' profit, $7,119.40.

If the goods were made from one-half skimmed fresh milk you would have the following:

Daily expenses as above	$ 123.00
1,560 pounds of pure cane sugar at five cents per pound	78.00
Seven barrels at 75 cents each	5.25
Total daily expenses	$ 206.25



Style of Vacuum Pan used five years ago—showing platform, etc.

Results, product one-half skimmed: 120 gallons of 20 per cent cream at 50 cents per gallon, $60.00; 3,745 pounds of one-half skimmed sugared condensed milk at 5½ cents per gallon $206.00; daily profit, $59.75; six months' or one hundred and eighty days' profit, $10,755.00.

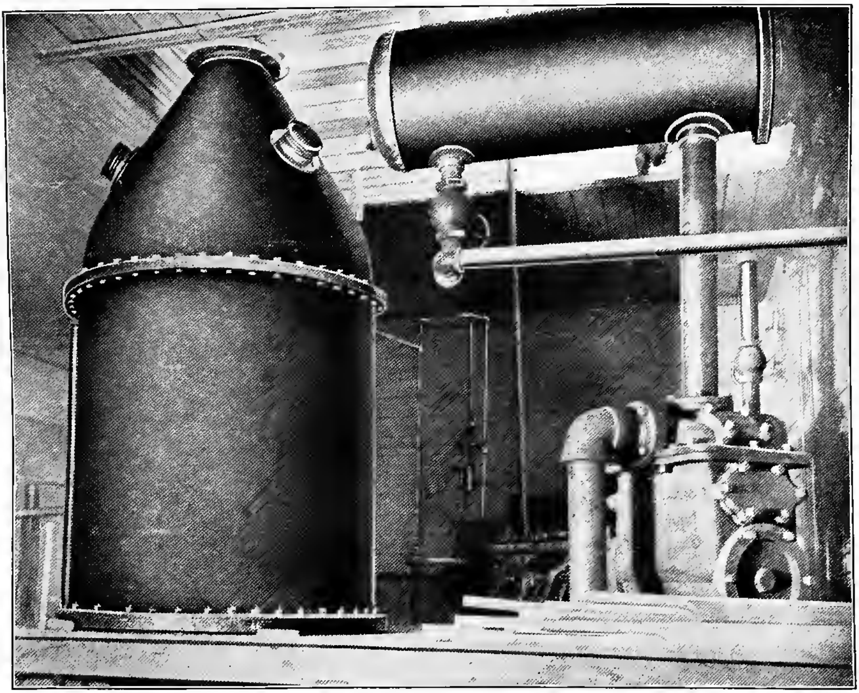
If the goods were made from full-skimmed fresh milk you would have the following:

Daily expenses as above	$ 123.00
1,305 pounds of pure cane sugar at five cents per pound	65.25

Six barrels at 75 cents each	4.50
Total daily expenses	$ 192.75

Results, product full-skimmed: 240 gallons of 20 per cent cream at 50 cents per gallon, $120.00; 3,118 pounds of full-skimmed sugared condensed milk at five cents per pound, $155.90; daily profit $83.15; six months' or one hundred and eighty days' profit, $14,967.00.

From the figures given above anyone will be fully able to determine what they can do under their local conditions, also the advantages of making condensed milk over all other methods of handling fresh milk. When the price of fresh milk is higher than that given above the price of condensed milk advances accordingly.

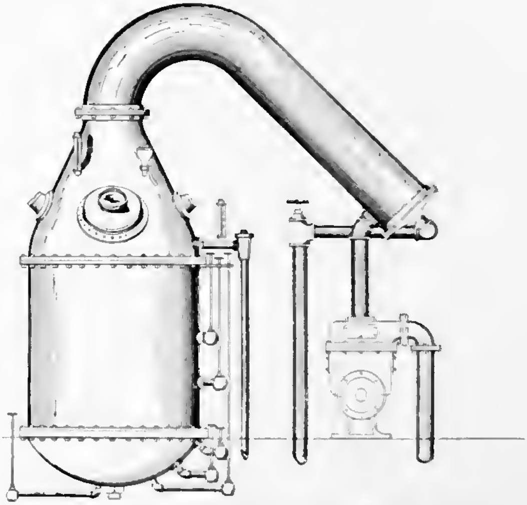


Style of Vacuum Pan used three years ago

There are many creameries who are practically throwing their skimmed milk away, which if it were condensed would more than pay for the fresh milk and operating expense, and leave the cream a clear profit.

There are so many different pieces of machinery used in the manufacture and putting up of the different kinds of condensed milk, which are necessary in one class of goods and not in others, that it is practically impossible to enumerate entirely the machinery and apparatus required to make and put up all the different kinds of condensed milk, but will give a part of the machinery which is termed "The Condensing Machinery," which is necessary in every factory.

The vacuum pan, vapor pipe, condenser and defecators are made entirely of very heavy copper, and all fittings and fixtures are made of composition metal, the seams being perfectly brazed, the entire copper triple hard hammered and finished perfectly smooth both inside and out. The steam coils in the vacuum pan are telescope brazed and smooth finished, and the braces which hold the coils are also smooth finished. All joints are sweated full of block tin and scraped and finished smooth, and all connections are ground joints requiring no gaskets. This copper work is constructed on the latest and most approved design, and has no superior in design, material or workmanship.



Latest Improved Vacuum Pan and Vacuum Pump Wet System

My cooling machines are built of steel and iron and constructed in the most perfect manner; being heavily braced with angle iron they will not give nor change from their original form. All gears are made from my own special plans and patterns. These machines, when fitted with my improved straight-sided cooling cans, stirrers and stirrer holders, have no superior in design, workmanship, or results produced.

My vacuum pumps are built by one of the largest pump companies in the world, and are of the highest possible efficiency and have no superior.

"Special Attachments" (so-called) are constructed of brass and composition metal, and add greatly to the manufacture of the plain unsugared condensed milk.

There is required in every factory besides the above, boilers, engines, cream separators, milk receiving facilities, water supply tank, water pumps, pipe and pipe fittings, valves, etc., etc.

The above would be practically all that would be required in the manufacture of the plain condensed milk and the barreled sugared goods, but if canned goods were to be manufactured there would be additional machinery required in the shape of tin can making machinery, labeling machinery, etc.; and if evaporated cream was to be made you would require sterilizing machinery, the price of which depends upon the amount of machinery installed, the capacity of the same, and the difference in the cost of manufacture of each piece of work by the different machines. In other words, whether the machines were hand machines, semi-automatic or automatic in their work. This cannot be explained satisfactorily in a work of this kind; but where one is interested in this class of machinery I shall be pleased to furnish full information.

I build condensing machinery by contract only, and to fit where located. It requires from sixty to ninety days to build a set of machinery after the closing of contract.

It is very difficult to secure the services of a first-class vacuum pan operator for a milk condensing factory, owing to the fact that operators desire to remain with the factory where they first learn the business; for this reason I instruct a man of the factory owner's selection how to handle the machinery, and how to make a first-class quality of condensed milk, and I also render all possible assistance in the other branches of the business.

Condensing machinery is very often placed in a creamery building and run in connection with the creamery, or in buildings built for other purposes. When new buildings are required I prefer not to build same, believing that local builders can build cheaper than I can, but I prefer to make plans and blue print drawings for such buildings, or for the necessary changes in buildings that have been built for other purposes, as my years of experience enables me to make such plans correctly, and I then know that no mistakes will be made in the building, and that the machinery can be set to the best possible advantage in every respect. I make such drawings and blue prints free of cost.

The prices quoted below are for "The Condensing Machinery," as mentioned before, F. O. B. cars Detroit, Mich., and include my services in superintending the proper setting of the machinery, also the instructions of an operator how to handle same and make a first-class merchantable quality of condensed milk. I will also give the capacity of boiler, engine, the floor space required in which to set the machinery, etc., of the different capacity machinery:

Daily Capacity	Price	Boiler Capacity	Engine Capacity	Space required including cooling mach.	Height from floor level
600 to 6000 lbs.	$ 3,500	40 H. P.	2 H. P.	10x18 feet	13 feet
1000 " 10000 "	5,000	50 "	3 "	12x18 "	14 "
1500 " 15000 "	6,500	70 "	3 "	12x20 "	15 "
2000 " 20000 "	8,000	100 "	4 "	14x20 "	15.6"
3000 " 25000 "	10,000	120 "	5 "	14x22 "	17 "
4000 " 35000 "	11,500	150 "	5 "	16x24 "	Two Story
4500 " 50000 "	13,500	250 "	6 "	20x30 "	Two Story

Discounts upon application.

It has been the custom of builders of milk condensing factories, as well as owners of such factories, to lead the public to believe that the machinery and process of manufacturing condensed milk was a GREAT SECRET known to few and very difficult to acquire, the object of the builder being to secure an exorbitant price for his machinery and services, claiming that the machinery was of a new and superior design, and would make superior goods, and leading the purchaser to believe that he was entering a great monopoly, and unless "he" built his factory it would be a failure.

The object of the owner of condensing factories being to frighten any one who contemplated installing condensing machinery from so doing, as it might interfere with their annual dividends of from 50 to 75 per cent.

There are a large number of inexperienced parties who are endeavoring to build milk condensing factories, claiming to know all about it, but wherever they have succeeded in building a factory it has proven a failure. The claims of these men have about as much foundation as the claims of some builders who claim to have made every improvement, both in machinery and process of making condensed milk that has been made in a great many years, to have built a great many times as many factories as all other builders combined, etc., etc. Their desire being to convey the idea that they are the only builders in the world that know how to build milk condensing machinery, install same, operate it and produce good goods.

To dispel these illusions I will say that there has been but a slight change in either machinery or process of manufacturing condensed milk in a good many years, the greatest improvement being in increasing the evaporating capacity in the condensing machinery. The older and larger condensing companies are to-day using the same condensing machinery and process of manufacture that they did years ago. The process of manufacturing condensed milk is not difficult to learn nor perform, as anyone with ordinary intelligence under my instructions is able to acquire the main principles in from fifteen to twenty days, and can obtain a full and complete knowledge of how to successfully produce a first-class article of condensed milk within thirty days.

It is not my intention to convey the idea that any one can build a set of milk condensing machinery, set and connect it and start it operating and make good goods, for that would be an impossibility. Condensing machinery must be constructed on certain lines to get the best finished product and greatest evaporating capacity, and the knowledge of how to operate it must be obtained from some one who has had years of experience and knows the business in all its details.

I do not wish to be understood as criticising anyone who may attempt to build such factories, my desire being to inform intending purchasers of milk condensing machinery of the mistakes that may be made, so that they will thoroughly investigate the claims and prices of all builders of milk condensing factories before closing a contract for their machinery, as it may save them a great many dollars on the original cost of their machinery and also an additional saving after they start to operate it.

I was a member of the original firm of C. T. Rogers & Sons, also secretary and treasurer of the incorporated company of the same name until July 10th, 1901, when I severed my connection with them, and shortly thereafter the company was disbanded. During the years I was connected with them I erected, started, and taught the operators in a large number of factories built by that company, but do not, however, desire to annex any of that company's reputation.

Since I have been in business for myself I have built several factories in different sections of the country, all of which have proven successful, which speaks for itself. I have a number of letters of indorsement from parties for whom I have built factories, which I shall be pleased to show to those that are interested, also to gain the admittance of those that are interested to factories of my build, where they can see the machinery in operation, the class of goods made, and ascertain fully the treatment that I afforded to those for whom I have built.

I make full and complete specifications a part of every contract, but furnish specifications in no other manner.

In conclusion, I wish to say that I am not a builder of cheap machinery, that my machinery is of the latest and most improved designs in every respect, and constructed of the best materials, in a thoroughly workmanlike manner, and that they have NO SUPERIOR.

The processes that I teach have been in use for some time and have not been found wanting. They are no new discoveries nor experiments, and produce goods that are second to none.

I personally superintend the erection of all machinery, and teach the operator how to handle the machinery and produce first-class goods, and there is never any trouble over what the contract says and the promises or statements made by the person closing the contract, for if I furnish you your machinery you deal with but one person.

It is my intention to sell machinery so that I shall make a legitimate margin of profit on same and charge a reasonable compensation for my services, but not to charge three or four times what such machinery and services are worth, simply because the intending purchaser has no way of ascertaining if the price I make him is exorbitant or not.

If I should supply you with your machinery you can rest assured that it will be as fine as any there is, and that it will produce as good goods as there are on the market, and that the matter will receive my personal attention as long as necessary.

If I have failed to cover any point to your entire saitsfaction I shall be pleased to furnish such information as desired, and will serve to the best of my ability those that favor me with contracts for machinery.

I shall be pleased to hear from those interested and all communications will receive my prompt attention. Thanking my many patrons, and soliciting the patronage of others, I am,

Very truly yours,
R. R. ROGERS.
Winthrop, Maine. ~~Detroit, Mich.~~

In writing for further information kindly fill out this page, tear where perforated and forward with your letter:

Have you a building that you think you can use?........ if so send sketch, showing shape and where you think of setting machinery, also location of boiler and engine.

Will you build new building?........ Have you a boiler?........ What is the horse power of same?......H.P. Have you an engine? .... What is the horse power of same?........H. P. Have you good drainage?........ Have you good water supply?........ Amount per minute........ gallons. Temperature of water in summer?......F; in winter?......F. How far are you from railroad?............. What per cent of butter fat does your milk contain?............ What amount can you secure daily?......... pounds. Also all other information that you can give, so that I may fully understand just how you are situated, so that I can give you correct information. ....